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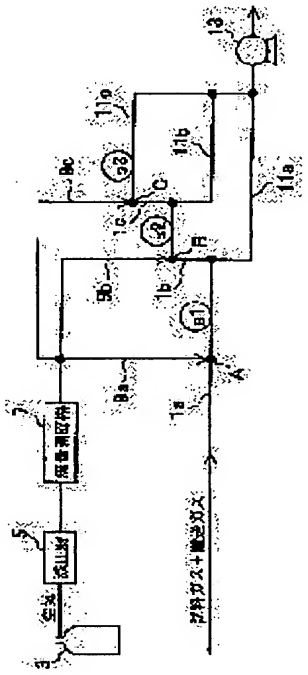
(54) ODOR DISCRIMINATING APPARATUS

(57)Abstract:
PROBLEM TO BE SOLVED: To improve the odor discriminating power by increasing the number of gas sensors effectively functioning in one measurement.
SOLUTION: When the sensitivity of the gas sensor disposed in a gas sensor chamber s1 is assumed to be one time to a predetermined odor component, the sensitivity of the gas sensor disposed in a gas sensor chamber s2 is two times thereof, the sensitivity of the gas sensor disposed in a gas sensor chamber s3 is four times thereof. The sample gas is diluted to 1/2 time by mixing the air at a merging point A of a sample gas flow passage 1a, and introduced in the gas sensor chamber s1. The sample gas passing through the gas sensor chamber s1 is distributed to a sample gas flow passage 1b and a discharge flow passage 11a, mixed with the air at a merging point B of the sample gas flow passage lb, and dilated to 1/4 time the original concentration of the sample gas, and introduced in the gas sensor chamber s2. The sample gas passing through the gas sensor chamber s2 is distributed to a sample gas flow passage 1c and a discharge flow passage 11b, mixed with the air at a merging point C of the sample gas flow passage 1c, dilated to 1/8 time the original concentration of the sample gas, and introduced to the gas sensor chamber s3.



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CLAIMS

[Claim(s)]
[Claim 1] It takes for being characterized by having two or more gas sensor rooms where it had two or more gas sensors, and smelled, and 1 or two or more gas sensors have been arranged in an identification unit, and the dilution device which can introduce the same sample gas as said two or more gas sensor rooms by desired concentration, respectively, and is an identification unit.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention was equipped with two or more gas sensors, smells, and relates to an identification unit. Such a smell identification unit is set in fields, such as management of deodorization, aroma, and food, and measurement of an offensive odor, and it is used in order to identify or identify a smell.
[0002]
[Description of the Prior Art] As a gas sensor, there are a metal oxide semiconductor sensor, a conductive polymer sensor, a sensor (QCM:Quartz Crystal Microbalance, quartz-resonator smallness gravimetric method) in which the gas adsorption film was formed on the front face of a quartz resonator, a sensor in which the gas adsorption film was formed on the front face of a SAW (Surface Acoustic Wave: surface acoustic waves) device, etc. By the oxide-semiconductor sensor, the phenomenon in which the electric resistance of an oxide semiconductor changes with the oxidation reduction reactions of the smell component in sample gas is used. By the conductive polymer sensor, the phenomenon in which the conductivity of a conductive polymer changes with adsorption of a smell component is used. In QCM or a SAW device, the phenomenon in which vibration frequency changes with the weight change by adsorption of a smell component on the gas adsorption film is used.
[0003] It took for measuring the smell component in sample gas using such a phenomenon, and the identification unit applied the technique called the so-called chemometrics (chemical mensuration) of having had two or more gas sensors with which the response characteristics over a smell component differ, and having displayed the detecting signal from a gas sensor as it is, or carrying the detecting signal of two or more gas sensors into multivariate analysis, and has measured the smell component in sample gas.
[0004] Generally, in the smell identification unit, it is said that the discernment force is improved, for example, in the thing by Shimadzu Corp., many gas sensors smell like six pieces (6ch), and it is attached in the identification unit, so that there are many gas sensors. Moreover, it had the function (a purge and trap function) which carries out uptake of the smell component to uptake tubing, and condenses it, and smells, and there is an identification unit. With such equipment, by changing an enrichment factor and carrying out multiple-times measurement of the same sample gas, the concentration of a smell component can be doubled with the sensibility range of each gas sensor, and suitable measurement can be performed.
[0005]
[Problem(s) to be Solved by the Invention] Although the discernment force is improved by forming many gas sensors, there is respectively suitable gas concentration range for measurement in each gas sensor, and all gas sensors are not functioning effectively in fact. The detecting signal from the gas sensor which is not functioning effectively becomes redundant at the time of data analysis, and becomes the cause of degrading S/N (amplitude of the amplitude / noise signal of a detecting signal).
[0006] Moreover, the sample capacity and time amount of an amount for carrying out multiple-times measurement of the same sample gas are required of equipment equipped with the purge

and the trap function. Then, in a smell identification unit, this invention increases the number of the gas sensors which function effectively during one measurement, and aims at decreasing the redundancy at the time of data analysis, and raising the discernment force.
[0007]
[Means for Solving the Problem] This invention is equipped with two or more gas sensor rooms where it had two or more gas sensors, and smelled, and it is an identification unit and 1 or two or more gas sensors have been arranged, and the dilution device which can introduce the same sample gas as two or more gas sensor rooms by desired concentration, respectively.
[0008] Two or more gas sensors are divided into every [1 or / plurality], and are arranged in two or more gas sensor rooms. The same sample gas as each gas sensor room is first introduced by desired concentration according to a dilution device as preliminary measurement, respectively. It judges whether about each gas sensor, it is functioning effectively based on the detecting signal and dilution ratio at the time of preliminary measurement, and the dilution ratio of the sample gas introduced to each gas sensor room is determined. The number of the gas sensors which function effectively during one measurement by this increases, the redundancy at the time of data analysis decreases, and the discernment force improves. Moreover, it takes to an object, and when the sensibility to a component takes to the object using a known gas sensor and measures a component, the dilution ratio of the sample gas beforehand introduced to each gas sensor room is set up, respectively, and you may measure, without performing preliminary measurement.
[0009]
[Example] Drawing 1 is the outline block diagram showing one example. In this example, one oxide-semiconductor sensor has been arranged, respectively in each three gas sensor rooms s1, s2, and s3, using an oxide-semiconductor sensor as a gas sensor. If sensibility of the 1st oxide-semiconductor sensor is made into 1 time to a certain smell component, the 2nd oxide-semiconductor sensor shall show twice as many sensibility as this, and the 3rd oxide-semiconductor sensor shall show one 4 times the sensibility of this. However, this invention is not limited to this example and modification various by within the limits of the summary of a publication is made as for it to a claim.
[0010] Sample gas-passageway 1a which supplies sample gas with carrier gas is connected to the gas sensor room s1. The 1st oxide-semiconductor sensor is arranged at the gas sensor room s1. The air bomb 3 which held the air for diluting sample gas is formed. Since oxygen was required for actuation of an oxide-semiconductor sensor, air was used as gas for dilution. The air bomb 3 is connected to the flow regulator 7 adjusted so that air may flow with constant flow through the pressure reducer 5 which lowers the pressure from the air bomb 3. The passage from a flow regulator 7 has branched to three, and one of them joins sample gas-passageway 1a as gas-passageway 9for dilution a in Juncture A.
[0011] The passage from the gas sensor room s1 has branched to two, one passage is connected to the gas sensor room s2 as sample gas-passageway 1b, and the passage of another side is connected to the suction pump 13 as outflow way 11a. The 2nd oxide-semiconductor sensor is arranged at the gas sensor room s2. One in the passage from a flow regulator 7 joins sample gas-passageway 1b as gas-passageway 9for dilution b in Juncture B.
[0012] The passage from the gas sensor room s2 has branched to two, one passage is connected to the gas sensor room s3 as sample gas-passageway 1c, and the passage of another side joins outflow way 11a as outflow way 11b, and is connected to the suction pump 13. The 3rd oxide-semiconductor sensor is arranged at the gas sensor room s3. One in the passage from a flow regulator 7 joins sample gas-passageway 1c as gas-passageway 9for dilution c in Juncture C. The passage from a gas sensor s3 joins outflow way 11b as outflow way 11c, and is connected to the suction pump 13. The passage from a suction pump 13 is connected to the exhaust port.
[0013] It is adjusted so that sample gas and the gas for dilution may be mixed by 1:1 in Junctures A, B, and C, and further, it is adjusted so that both the distribution rate to sample gas-passageway 1b and outflow way 11a and the distribution rate to sample gas-passageway 1c and outflow way 11b may be set to 1:1. Thereby, it introduces into the gas sensor room s1, and

dilutes with Juncture B quadrant twice, and the mixed gas of the sample gas supplied from the sample gas passageway 1 and carrier gas is introduced into the gas sensor room s2, is diluted [it dilutes with Juncture A 1/2 time, and] with Juncture C 1/8 time, and is introduced into the gas sensor room s3. Thus, according to the sensibility of the 1st, 2nd, and 3rd oxide-semiconductor sensors, sample gas can be introduced by suitable concentration.

[0014] Flow control devices, such as a flow control valve, may be prepared in the gas passagewaies 9a, 9b, and 9c for dilution, and the outflow ways 11a, 11b, and 11c. And you may make it adjust the dilution ratio of the sample gas which follows to an object and is introduced into the gas sensor rooms s1, s2, and s3 according to a component. When using air as carrier gas, it is not necessary to perform installation of the oxygen in Juncture A. To use the gas which does not contain oxygen with inactive [of nitrogen etc.] as carrier gas, it is necessary to take into consideration the oxygen density in each gas sensor rooms s1, s2, and s3 further using the gas which contains oxygen as gas for dilution.

[0015] In this example, although the oxide-semiconductor sensor is used as a gas sensor, this invention is not limited to this and may use a conductive polymer sensor and the sensor using QCM and a SAW device. Furthermore, you may arrange combining the gas sensor with which these principles of operation differ. When it has only the gas sensor which does not need oxygen for actuation, it is not necessary to use air as the gas for dilution, and carrier gas. Moreover, although the gas sensor rooms s1, s2, and s3 are connected to a serial in this example, this invention is not limited to this, arranges two or more gas sensor rooms to juxtaposition, and distributes the same sample gas, and it carries out dilution adjustment and you may make it introduce it into desired concentration for every gas sensor.

[0016]

[Effect of the Invention] Two or more gas sensor rooms where 1 or two or more gas sensors have been arranged in the smell identification unit of this invention, Since it has the dilution device which can introduce the same sample gas as two or more gas sensor rooms by desired concentration, respectively, sample gas is diluted according to the sensibility of the arranged gas sensor and it was made to introduce into each gas sensor room The number of the gas sensors which function effectively during one measurement can be increased, the redundancy at the time of data analysis can be decreased, and the discernment force can be raised.

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